



Regional Integrated Sciences and Assessments

**Building
Bridges Between
Climate Sciences
and Society**

The NOAA Regional Integrated Sciences and Assessments Program

With each passing year, the impacts of climate variability on water availability, wildfire regimes, public health, agriculture, and energy issues become more acute. At the same time, climate sciences are making great strides in producing knowledge that could aid decision makers dealing with these issues. The key question is how can we improve the link between climate sciences and society?

The Regional Integrated Sciences and Assessments (RISA) Program is helping to realign our nation's climate research to better serve society. Established by the National Oceanic and Atmospheric Administration (NOAA) in the mid-1990s, RISA projects point the way toward a new paradigm of 'stakeholder-driven' climate sciences that directly address society's needs and concerns.

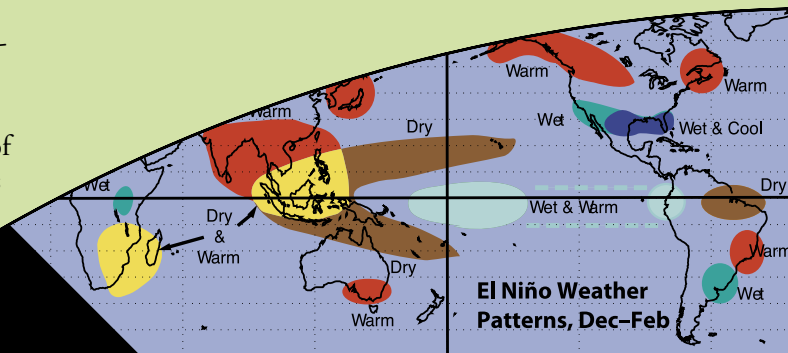
The RISA program began with university-based efforts in regions of the United States where recent advances in integrated climate sciences held the greatest promise to assist decision making. Much of the first-generation RISA success built on breakthroughs in predicting variability, change, and impacts of climate processes occurring in the tropical Pacific Ocean. This is the area where El Niño and La Niña conditions—which affect much of the western and southern United States, as well as Mexico—originate.

As climate prediction skill improves, much of the nation stands to benefit from regional RISA activities. The RISA goal is to

conduct the kinds of research and product development needed to help society make decisions in the face of climate variability and change, using experts from NOAA and other partner institutions.

Usable Climate Sciences

What makes science useful and usable for the public? Much work has gone into answering this question, and the RISAs have been at the forefront of the effort. RISA researchers place strong emphasis on working directly with people who have an investment—a "stake"—in activities, resources, or property that may be vulnerable to climatic impacts. These stakeholders hold the key to scientists' understanding of what kinds of climate information can aid the public in coping with climate variability, and how to provide this information in forms that people can actually use.



research

El Niño-Southern Oscillation
Observing System

observation

climate sciences

Like any field of science, climate research can seem murky to the general public. Translating climate science into products and services the public can use involves traditional research, experimental translation and refinement, and transition to operational climate services. □

Sustainable Decision Support

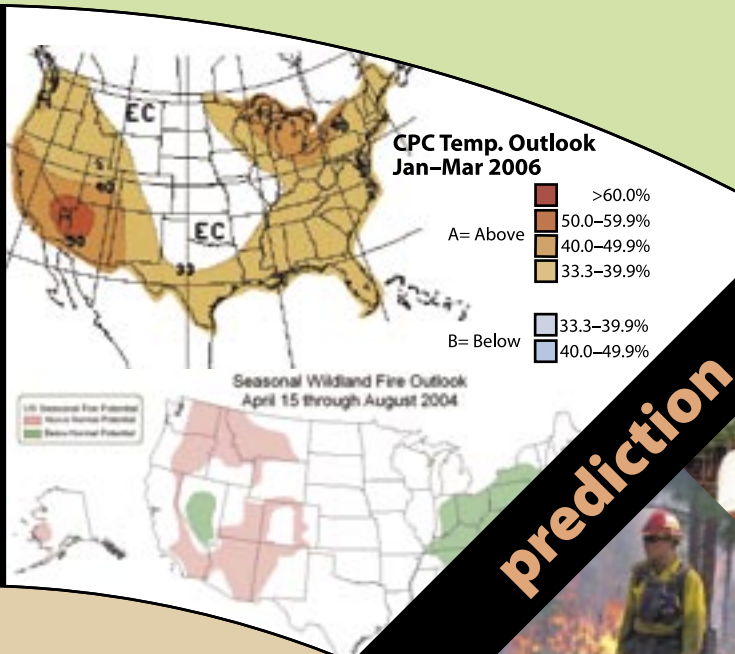
Climate information is just one of the many types of knowledge stakeholders need to make effective decisions. Helping people determine how to combine climate information with other types of knowledge is part of integrated assessments. Another part is making sure that decision support meets the needs of local, state, and federal agencies. The RISAs also build sustainable decision support by establishing long-term trust and open dialogue in close partnership with communities, the public and private sectors, and nonprofit organizations. Because they are based in universities and other scientific institutions, the RISAs offer opportunities for future scientists and decision makers to be trained in the production and use of integrated climate knowledge and ultimately to meet the ever-growing demand for climate knowledge in decision support.

Place-Based Integrated Climate Sciences

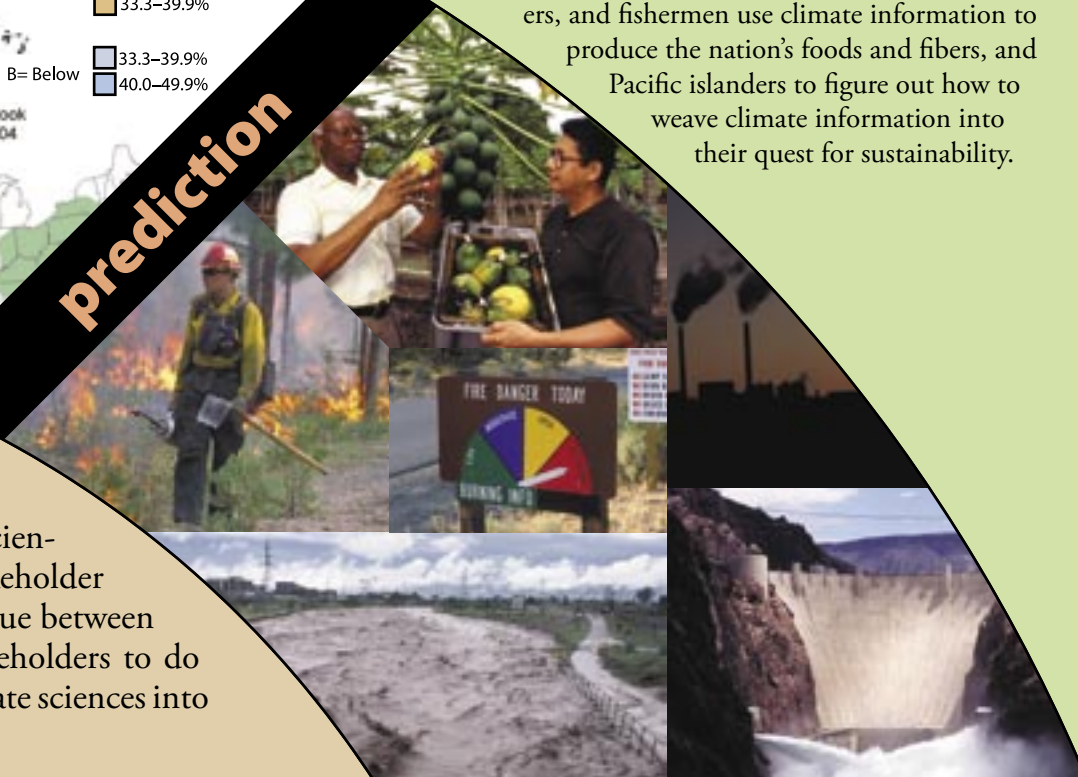
The RISA approach puts regional- and local-scale research front and center. This research is a primary part of building and nurturing effective climate services. Each of the RISA projects comprises experts from the biophysical and societal sciences who work with regional and/or local stakeholders to address important climate impact issues and information needs in their area. The RISAs link climate observations and predictions with vulnerability, institutional, and economic assessments. As a result they are creating a wealth of knowledge about who or what is vulnerable to climate at various time and spatial scales. In working with stakeholders and partners to create products that can help reduce vulnerability, the RISAs are building bridges that will sustain two-way flows of information between science and society.

How RISAs Make a Difference

Today, RISA scientists provide information that decision makers can use to cope with drought, understand climatic influences on wildfire, and assess climate impacts on air quality and human health. Such information can be used by stakeholders to evaluate potential climate change impacts on water supplies and hydroelectric power and support disaster management planning. RISAs are helping farmers, ranchers, and fishermen use climate information to produce the nation's foods and fibers, and Pacific islanders to figure out how to weave climate information into their quest for sustainability.



- This not only aids decision makers in coping with climate vulnerability, but it increases scientific understanding of stakeholder needs. RISAs provide the glue between scientific agencies and stakeholders to do the work of translating climate sciences into climate services.



climate services

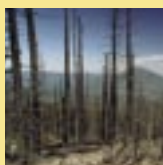
decisions

RISA Payoffs

The knowledge RISA scientists and their stakeholder partners produce is opening doors to thinking more broadly about the ways climate, environment, and society work together to create the many dimensions of risk.



Agriculture: Annual U.S. gross farm income exceeds \$245 billion, according to USDA statistics. Farmers have always kept track of the weather in managing their crops and animals. Now, through the kinds of climate information RISAs provide, they can plan seasons or longer in advance to increase their profitability and decrease their risk exposure.



Wildland Fire: Wildfires are expensive and can be deadly. In 2003 alone, wildfires burned about 4 million acres, destroyed more than 5,000 structures, took the lives of 30 firefighters, and required more than \$1 billion to extinguish the blazes. The National Interagency Fire Center's Predictive Services Unit, in collaboration with RISAs, now issues fire-climate forecasts for planning in advance of fire seasons across the country. The forecasts allow decision makers to estimate resource needs, identify opportunities to reduce serious fuel overloads, and develop public information campaigns to reduce fire risk.



Water: Life cannot thrive without adequate water. In California alone, by 2020, economic losses linked to water scarcity are projected to average \$1.6 billion per year. Assuring water to meet the vast array of demands requires the best science available. RISAs have been at the forefront in providing climate and hydrological information stretching from thousands of years in the past to a hundred or more years into the future. For example, RISA scientists studying snow hydrology in the West are developing cutting-edge hydrological models to aid water resource managers in planning.



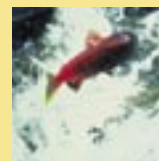
Public Health: Medical and air quality experts increasingly look to climate information to protect people from threats to air and water quality, as well as from diseases carried by mosquitoes, rodents, and other carriers influenced by climate conditions. RISAs are working to provide the decision-support tools needed to include climate, ecology, and health interactions in public health planning.



Drought: Between 1983 and 2003, drought losses amounted to nearly \$160 billion, leading all other weather/climate disaster costs. In 2000 alone, drought and associated fire weather accounted for \$6.3 billion in property and crop damage losses. Managing drought risk means having a good plan in place before drought makes itself known, and being able to implement the plan quickly when drought impacts occur. The RISA projects provide the scientific knowledge needed to anticipate, track, assess, and respond to drought threats at regional and local levels.



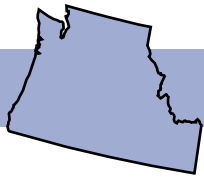
Energy Demand: Trends in climate and non-transportation energy demand go hand in hand. The federal government's 2001 National Energy Policy Report estimates that total U.S. energy consumption will rise by about 32 percent between now and 2020. A large portion of this energy will be used for heating and cooling—demands that are heavily influenced by climate. The energy industry increasingly relies on the kinds of climate information RISAs provide to anticipate and meet these energy demands.



Fisheries: Climate has a strong impact on fisheries off the coasts of the United States. For example, Pacific salmon catches are affected by El Niño and La Niña, and by the Pacific Decadal Oscillation. RISA stands at the forefront of interdisciplinary climate research that benefits fishery operations and salmon recovery efforts.



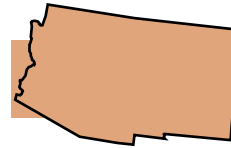
Extreme Events: NOAA estimates that between 1983 and 2003, hurricanes, storm events, and floods in the United States generated total losses ranging from \$49.2 to \$92.1 billion. Climate models suggest that over the next hundred years, the intensity and occurrence of extreme events are likely to grow. Anticipated impacts such as sea level rise, snowpack reduction, increase in heat waves and air pollution, and changes in water resource availability pose serious challenges to the nation. The RISAs endeavor to foster understanding about past, present, and potential future climate and build the capacity to evaluate and use a wide range of climate information. These efforts help the public prepare for today's challenges and for future climatic conditions.



Pacific Northwest Climate Impacts Group

- streamflow forecasts
- fisheries
- drought
- snowpack
- climate adaptation
- forests
- coasts

The Climate Impacts Group (CIG), located at the University of Washington-Seattle, examines the impacts of natural climate variability and global climate change in the U.S. Pacific Northwest. CIG's goal is to increase the resilience of the region to climate fluctuations through research and interaction with stakeholders. Research emphasizes four key sectors of the Pacific Northwest environment: water resources, aquatic ecosystems, forests, and coastal systems. Focusing on the intersection of climate sciences and public policy, CIG works with planners and policy-makers to apply climate information to regional decision-making processes.



Climate Assessment for the Southwest

- forecast evaluation
- drought response
- rural & urban impacts
- wildland fire
- water policy
- health
- paleoclimate
- snowpack

The Climate Assessment for the Southwest (CLIMAS) project fosters collaboration between university researchers, agency scientists, resource managers, educators, and decision makers throughout the region to understand climate and its impacts on human and natural systems in the U.S. Southwest and adjacent U.S.-Mexico border area. CLIMAS investigates vulnerability to climate variability in both rural and urban areas, how to improve climate inputs for drought planning, and climate impacts on water resources, water policy, and wildland fire. CLIMAS studies how climate information is used by decision makers and works to evaluate and improve forecasts.



California Applications Program

- wildfire
- human health
- drought
- streamflow forecasts
- water resources
- climate change

The California Applications Program (CAP), led by researchers at the Scripps Institution of Oceanography, is a collective of university, federal, and private agency scientists studying the impacts of climate variability and change in California and the surrounding area. CAP evaluates weather and short-term climate forecasts and climate change projections, with particular attention to climate influences from the Pacific Ocean and western North America. An associated emphasis is to develop a better capacity for observing the climate over the complex landscape of the California region. CAP is working to improve climate information for decision makers in key sectors, including water, human health, and wildfire.



Pacific Islands*

- extreme events
- water resources
- ENSO forecasts
- climate risk management
- climate adaptation

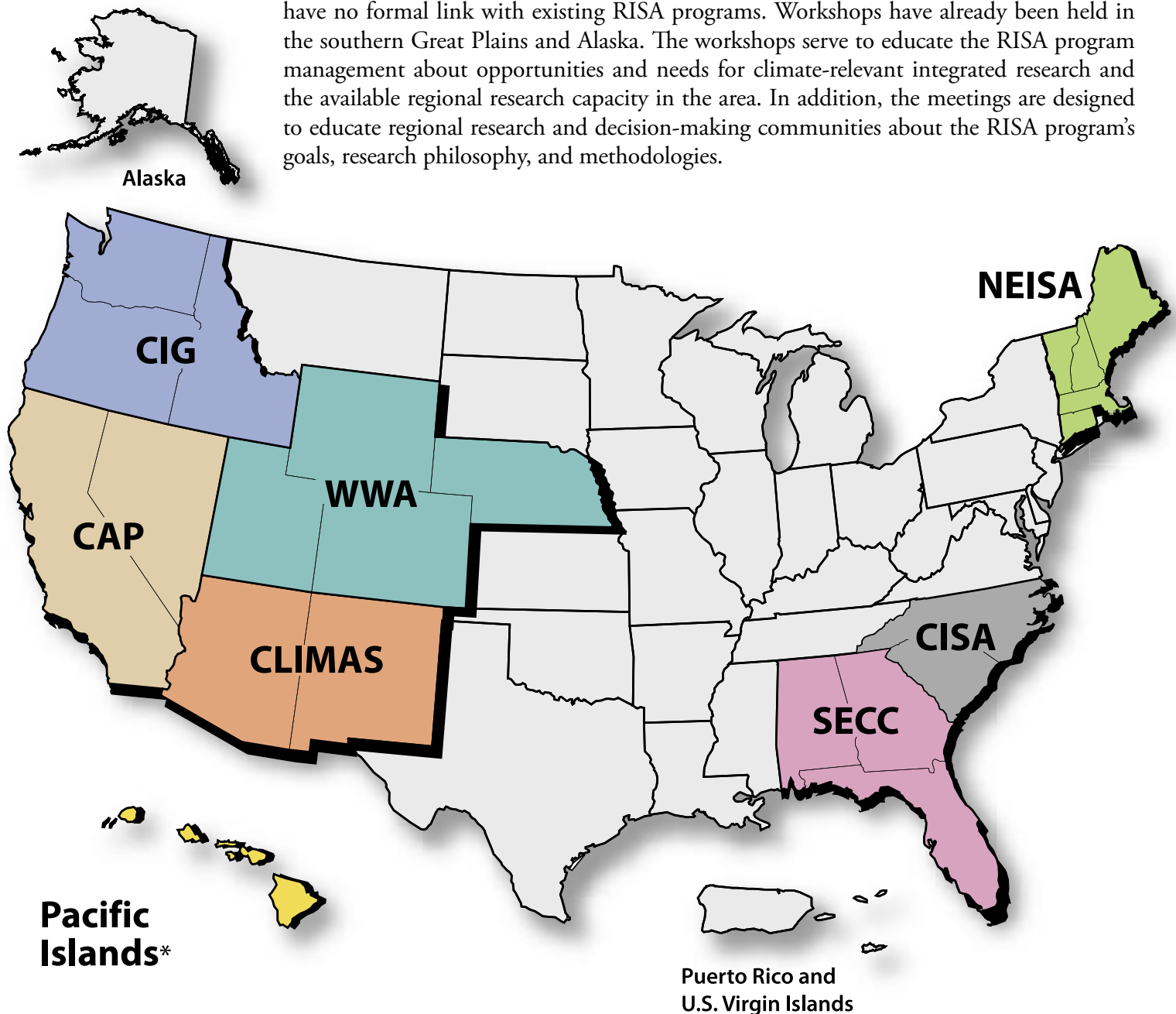
The Pacific Islands RISA supports emerging regional efforts to pursue an integrated program of climate risk management. With an emphasis on understanding and reducing Pacific Island vulnerability to climate-related extreme events such as drought, floods, and tropical cyclones, activities within this emerging RISA build substantially on existing regional efforts in climate sciences and El Niño forecasting. Led by researchers at the East-West Center in Hawai'i, Pacific RISA works in close collaboration with stakeholders in water and natural resources, agriculture, tourism, and public safety and health.

*Includes Hawai'i, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau.

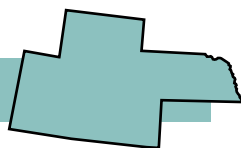
THE RISA NETWORK

The map below shows eight regions where currently funded RISA programs operate. While each RISA targets a specific U.S. region, the work of each program extends past these boundaries—creating research and products that are useful for stakeholders across the country and beyond.

NOAA is also sponsoring workshops in regions across the United States that currently have no formal link with existing RISA programs. Workshops have already been held in the southern Great Plains and Alaska. The workshops serve to educate the RISA program management about opportunities and needs for climate-relevant integrated research and the available regional research capacity in the area. In addition, the meetings are designed to educate regional research and decision-making communities about the RISA program's goals, research philosophy, and methodologies.



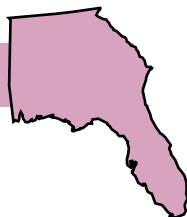
Western Water Assessment



The Western Water Assessment (WWA) provides information about climate variability and climate change to water resource decision makers with the goal of improving management of the Intermountain West's most critical resource, water. Through partnerships with key decision makers, WWA provides vulnerability assessments, climate forecasts, and paleoclimate studies designed to enhance short-term and long-term management decisions. WWA experts focus on the Colorado and Platte River Basins, researching policy options, streamflow forecasting, snowpack monitoring, drought planning, and reservoir management.

- water policy
- snowpack
- drought
- streamflow
- reservoir management

Southeast Climate Consortium



The Southeast Climate Consortium (SECC) is a multi-institutional, multi-disciplinary team focusing on the vulnerability of agriculture, forestry, and water resources management to climate variability. SECC scientists are developing methods to translate regional climate forecasts into local forecasts, linking them with crop and hydrology simulation models in order to enhance understanding of decision makers so they can reduce risks associated with climate variability. The Consortium is developing partnerships needed to build equitable outreach programs for farmers, forest managers, water resource managers, home owners, and policymakers to enhance user familiarity with seasonal climate forecasts.

- wildfire risk
- frost and freeze
- crop management
- drought risk
- forest management
- water management
- local scale forecasts

New England Integrated Sciences and Assessments



The New England Integrated Sciences and Assessments (NEISA) project investigates links between climate variability and air quality downwind of the Mid-Atlantic and Midwest regions. NEISA's primary goal is to develop decision-relevant information about interactions between climate, weather, and air quality for the citizens of New England. To this end, NEISA engages a wide range of stakeholders to investigate the link between pulmonary health and air quality to develop informed public policy and guide the development of air quality forecasting research efforts in New England.

- climate
- air quality
- health

Carolinas Integrated Sciences and Assessments



The Carolinas Integrated Sciences and Assessments (CISA) project aims to improve the range, quality, relevance, and accessibility of climate information for water resource management in North and South Carolina. CISA examines water resource issues at interannual, decadal, and longer scales to determine how decision makers use climate information to manage water and how current operational practices can benefit from new climate and water resource products. CISA investigates how best to present climate sciences that are relevant to water resource policy, and to foster understanding of climate variability, issues of forecast uncertainty, and risks associated with forecast failure.

- water quality
- water supply
- drought
- decision support

For more information

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Brochure produced by:
Institute for the Study of Planet Earth
University of Arizona
PO Box 210156, Tucson, Arizona 85721
Editor: Shoshana Mayden

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Carolinas Integrated Sciences and Assessments
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New England Integrated Sciences and Assessments
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**Pacific Islands
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Western Water Assessment
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